

5 1) An improved electrical connection device for use in an image forming apparatus comprising of a printer, copy machine or a facsimile machine or a toner cartridge used therein to supply a bias voltage to a developer roller whereby a bias voltage contact fits into the developer roller

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whereby said electrobrushing acts as an electrical contact and also as a bearing and has sized to receive said second portion of said bias voltage contact;

wherein a first end of said electrobushing makes electrical continuity with a power supply of
15 the image forming apparatus;

and a second end of said electrobushing receives said second portion of said bias voltage contact and thus said electrobushing makes electrical continuity with said second portion of said bias voltage contact;

and thus said electrobrushing not only acts as a bearing but also helps supply electricity to the
20 developer roller.

2) An improved electrical connection device as in claim 1 whereby said electrobrushing has a cylindrical portion.

25 3) An improved electrical connection device as in claim 2 whereby said electrobrushing has a rim.

4) An improved electrical connection device as in claim 3 whereby said electrobushing has a flat ring shaped portion formed where said cylindrical portion joins said rim.

5) An improved electrical connection device as in claim 3 wherein said rim has a first flat surface that makes rotational electrical contact with a second flat surface on said bias voltage contact positioned in distance where said first portion and said second portion join but perpendicular to central axis of said first portion and at least the diameter of said first portion.

6) An improved electrical connection device as in claim 1 whereby said electrobushing is made of metal.

7) An improved electrical connection device as in claim 1 whereby said electrobushing is made of conductive plastic.

8) An improved image forming apparatus as in claim 1 wherein said first end of said electrobushing makes electrical contact with a contact ring located on said endcap.

9) An improved electrical connection device as in claim 1 wherein said first portion of said bias voltage contact has both a larger diameter portion and a smaller diameter portion for making a better press-fit.

10) An improved toner cartridge used in an image forming apparatus comprising of a dry toner style printer, copy machine or facsimile machine;

whereby said toner cartridge includes of a toner hopper and a waste toner hopper;

whereby said waste toner hopper includes of a photoreceptor, a cleaning blade, a charging device for electrostatically charging said photoreceptor and a container to receive waste toner;

whereby said toner hopper includes of a storage tank, an endcap and a developer roller;

5 whereby a bias voltage contact fits into said developer roller;

whereby said bias voltage contact has a first portion that fits inside said developer roller and has electrical continuity with an inner wall of said developer roller;

whereby a second portion of said bias voltage contact has a region that is cylindrical in shape; and

10 whereby said cylindrical region of said second portion of said bias voltage contact is of a smaller diameter than said first portion and rotates in an electrobrushing;

whereby a first end of said electrobrushing has a bore to receive said cylindrical portion of said second portion of said bias voltage contact in such a way such that said electrobrushing acts as a rotational bearing of said cylindrical region of said second portion of said bias voltage contact;

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and said electrobrushing also has electrical continuity with said bias voltage contact;

and a second end of said electrobrushing makes electrical continuity with a power supply of the image forming apparatus;

and thus the power supply of the image forming apparatus supplies a bias voltage which electrically connects to said electrobrushing which electrically connects to said bias voltage contact which electrically connects to said inner wall of said developer roller;

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whereby said developer roller thereby receives said bias voltage;

and thus with said bias voltage said developer roller manipulates a toner on an outer surface of said developer roller whereby said toner is a powder;

25 and thus said developer roller is capable of supplying said toner to said photoreceptor;

and thus with said bias voltage said developer roller manipulates said toner supplied to said photoreceptor;

so as to supply the correct amount of said toner to said photoreceptor;

and so that said developer roller will receive back some of the unused said toner that said

5 photoreceptor does not use;

whereby said toner transported from said developer roller to said photoreceptor is manipulated with said bias voltage;

and also unused said toner transported from said photoreceptor and returned to said developer roller is also manipulated by said bias voltage.

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11) An improved toner cartridge as in claim 10 whereby said electrobrushing has a cylindrical portion.

12) An improved toner cartridge as in claim 11 whereby said electrobrushing has a rim.

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13) An improved toner cartridge as in claim 12 whereby said electrobrushing has a flat ring shaped portion formed where said cylindrical portion joins said rim.

14) An improved electrical connection device as in claim 12 wherein said rim has a first flat surface that makes rotational electrical contact with a second flat surface on said bias voltage contact positioned in distance where said first portion and said second portion join but perpendicular to said first portion and at least the diameter of said first portion.

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15) An improved toner cartridge as in claim 10 whereby said electrobrushing is made of metal.

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16) An improved toner cartridge as in claim 10 whereby said electrobrushing is made of conductive plastic.

17) An improved image forming apparatus as in claim 10 wherein said second end of said
5 electrobrushing makes electrical contact with a contact ring located on said endcap.

18) An improved image forming apparatus comprising of a dry toner style printer, copy machine or facsimile machine;

whereby said improved image forming apparatus makes an image on media;

10 where media may be paper, overhead slide media, microfilm, plastic, labels, cardboard, disk labels, CDROM labels or any dry toner printable media used with a xerographic imaging device;

whereby said improved image forming apparatus contains a toner storage container, a waste toner hopper, a photoreceptor, a cleaning blade, a fuser section, a photoreceptor charging

15 device and a transfer section;

whereby said toner storage container has a storage tank, an endcap and a developer roller;

whereby a bias voltage contact fits in one end of said developer roller;

whereby said bias voltage contact has a first portion that fits inside said developer roller and has electrical continuity with an inner wall of said developer roller;

20 whereby a second portion of said bias voltage contact has a portion that is cylindrical in shape;

and whereby said cylindrical portion of said second portion of said bias voltage contact is of a smaller diameter than said first portion and rotates in an electrobrushing;

whereby said electrobrushing has a bore to receive said cylindrical portion of said second

25 portion of said bias voltage contact at a first end in such a way where said electrobrushing acts

as a rotational bearing of said cylindrical portion of said second portion of said bias voltage contact;
and said electrobrushing also has electrical continuity with said bias voltage contact;
and a second end of said electrobrushing makes electrical contact directly or indirectly with a
power supply of said improved image forming apparatus;

5 and thus said power supply of said improved image forming apparatus supplies a bias voltage
which electrically connects to

said electrobrushing which electrically connects to said bias voltage contact which electrically
connects to said inner wall of said developer roller;

whereby said developer roller thereby receives said bias voltage;

10 and thus with said bias voltage said developer roller manipulates a toner on outer surface of
said developer roller whereby said toner is a powder;

and thus said developer roller is capable of supplying said toner to said photoreceptor;

and thus with said bias voltage said developer roller manipulates said toner supplied to said
photoreceptor;

15 so as to supply the correct amount of said toner to said photoreceptor;

and so that said developer roller will receive some of the unused said toner that said
photoreceptor does not use;

whereby said toner transported from said developer roller to said photoreceptor is manipulated
with said bias voltage;

20 and also said toner transported from said photoreceptor and returned to said developer roller is
also manipulated by said bias voltage.

19) An improved image forming apparatus as in claim 18 whereby said electrobrushing has a
cylindrical portion.

20) An improved image forming apparatus as in claim 19 whereby said electrobrushing has a rim.

21) An improved image forming apparatus as in claim 20 whereby said electrobrushing has a flat ring shaped portion formed where said cylindrical portion joins said rim.

22) An improved electrical connection device as in claim 20 wherein said rim has a first flat surface that makes rotational electrical contact with a second flat surface on said bias voltage contact positioned in distance where said first portion and said second portion join but perpendicular to said first portion and at least the diameter of said first portion.

23) An improved image forming apparatus as in claim 18 whereby said electrobrushing is made of metal.

24) An improved image forming apparatus as in claim 18 whereby said electrobrushing is made of conductive plastic.

25) An improved image forming apparatus as in claim 18 wherein said second end of said electrobrushing makes electrical contact with a contact ring located on said endcap.

26) A method of making an improved image forming apparatus comprising of a dry toner style printer, copy machine or facsimile machine;
whereby the improved image forming apparatus makes an image on media;

where media may be paper, overhead slide media, microfilm, plastic, labels, cardboard, disk labels, CDROM labels or any dry toner printable media used with a xerographic imaging device;

whereby said method involves manufacturing an improved image forming apparatus which

5 has a toner storage container, a waste toner hopper, a photoreceptor, a cleaning blade, a fuser section, a photoreceptor charging device and a transfer section;

whereby the toner storage container has a storage tank, an endcap and a developer roller;

whereby said method involves a step of placing a bias voltage contact in one end of the developer roller;

10 whereby the bias voltage contact has a first portion that fits inside the developer roller and makes electrical contact with an inner wall of the developer roller;

whereby a second portion of the bias voltage contact has a portion that is cylindrical in shape is of a smaller diameter than the first portion and ;

and whereby said method involves a step of positioning the cylindrical portion of the second

15 portion of the bias voltage contact in an electrobrushing where the bias voltage contact can rotate;

whereby the electrobrushing has a bore to receive the cylindrical portion of the second portion of the bias voltage contact at a first end in such a way that electrobrushing acts as a rotational bearing of the cylindrical portion of the second portion of the bias voltage contact;

20 and the electrobrushing also makes electrical contact with the bias voltage contact;

and a second end the electrobrushing makes electrical contact directly or indirectly with a power supply of the improved image forming apparatus;

and thus the power supply of the improved image forming apparatus supplies a bias voltage which electrically connects to the electrobrushing which electrically connects to the bias

25 voltage contact which electrically connects to the inner wall of the developer roller;

whereby the developer roller thereby receives the bias voltage;

and thus with the bias voltage the developer roller manipulates a powdered toner on an outer surface of the developer roller;

and thus the developer roller is capable of supplying the toner to the photoreceptor;

and thus with the bias voltage the developer roller manipulates the toner supplied to the

5 photoreceptor;

so as to supply the correct amount of the toner to the photoreceptor;

and so that the developer roller will take back some of the unused the toner that the photoreceptor does not use;

whereby the toner transported from the developer roller to the photoreceptor is manipulated

10 with the bias voltage;

and also the toner transported from the photoreceptor and returned to the developer roller is also manipulated by the bias voltage.

27) A method as in claim 27 whereby the electrobrushing has a cylindrical portion.

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28) A method as in claim 27 whereby the electrobrushing has a rim.

29) A method as in claim 28 whereby the electrobrushing has a flat ring shaped portion formed where the cylindrical portion joins the rim.

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30) A method as in claim 28 wherein the rim of the electrobrushing has a first flat surface that makes rotational electrical contact with a second flat surface on the bias voltage contact positioned in distance where the first portion and the second portion join but perpendicular to the central axis of the first portion and at least the diameter of the first portion,

25 a step involving positioning the rim of the electrobrushing to make electrical contact with the second flat surface of the bias voltage contact.

31) A method as in claim 27 wherein a step in the process is included where the second end of the electrobrushing makes electrical contact with a contact ring located on the endcap; and
whereby a step involves positioning the electrobrushing so that it electrically contacts the contact ring.

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32) An improved electrical connection device for use in an image forming apparatus comprising of a printer, copy machine or a facsimile machine or a toner cartridge used therein to supply a bias voltage to a developer roller whereby a bias voltage contact fits into the
10 developer roller; and

whereby said bias voltage contact has a first portion that fits into the developer roller;
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whereby said bias voltage contact has a second portion which is cylindrical; and
wherein the developer roller has a counterbore and therefore has a larger diameter bore
15 region and a smaller diameter bore region; and

said first portion of said bias voltage contact has a larger diameter portion and a
smaller diameter portion; and

said larger diameter portion of said first portion of said bias voltage contact fits into
the larger diameter bore region while said smaller diameter portion of said first portion of said
20 bias voltage contact fits into the smaller diameter bore region.

33) An improved electrical connection device as in claim 32 wherein said first portion of said
bias voltage contact press-fits into the developer roller.

34) An improved electrical connection device as in claim 32 wherein a spring makes electrical contact between said second portion of said bias voltage contact and a power supply of the image forming apparatus.

5 35) An improved electrical connection device as in claim 32 wherein a spring makes electrical contact between said second portion of said bias voltage contact and a contact ring in an endcap of the toner cartridge.

36) An improved toner cartridge used in an image forming apparatus comprising of a dry
10 toner style printer, copy machine or facsimile machine;

whereby said toner cartridge comprises of a toner hopper and a waste toner hopper;
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whereby said waste toner hopper comprises of a photoreceptor, a cleaning blade, a
charging device for electrostatically charging said photoreceptor and a container to receive
15 waste toner; and

whereby said toner hopper comprises of a storage tank, an endcap and a developer
roller; and

whereby a bias voltage contact fits into said developer roller; and

whereby a first portion of said bias voltage contact has a region that is cylindrical in
20 shape that fits inside said developer roller and has electrical continuity with an inner wall of
said developer roller; and

wherein said developer roller has a counterbore and therefore has a larger diameter
bore region and a smaller diameter bore region; and

said first portion of said bias voltage contact has a larger diameter portion and a
25 smaller diameter portion; and

said larger diameter portion of said first portion of said bias voltage contact fits into said larger diameter bore region while said smaller diameter portion of said first portion of said bias voltage contact fits into said smaller diameter bore region for a better fit and better electrical connection with inner wall of said developer roller; and

5 wherein said bias voltage contact has a second portion.

37) An improved toner cartridge as in claim 36 wherein said first portion of said bias voltage contact press-fits into said developer roller.

10 38) An improved toner cartridge as in claim 36 wherein a spring makes electrical contact between said second portion of said bias voltage contact and a power supply of the image forming apparatus.

15 39) An improved toner cartridge as in claim 36 wherein a spring makes electrical contact between said second portion of said bias voltage contact and a contact ring in said endcap of said toner cartridge.

40) An improved image forming apparatus comprising of a dry toner style printer, copy machine or facsimile machine;

20 whereby said improved image forming apparatus makes an image on media;

where media may be paper, overhead slide media, microfilm, plastic, labels, cardboard, disk labels, CDROM labels or any dry toner printable media used with a xerographic imaging device;

whereby said improved image forming apparatus contains a toner storage container, a waste

25 toner hopper, a photoreceptor, a cleaning blade, a fuser section, a photoreceptor charging device and a transfer section;

whereby said toner storage container has a storage tank, an endcap and a developer roller;
whereby a bias voltage contact fits in one end of said developer roller;
whereby said bias voltage contact has a first portion that fits inside said developer roller and
has electrical continuity with an inner wall of said developer roller;

5 whereby a second portion of said bias voltage contact has a portion that is cylindrical in
shape and is of a smaller diameter than said first portion and ; and

wherein said developer roller has a counterbore and therefore has a larger diameter bore
region and a smaller diameter bore region; and

10 said first portion of said bias voltage contact has a larger diameter portion and a
smaller diameter portion; and

said larger diameter portion of said first portion of said bias voltage contact fits into
said larger diameter bore region while said smaller diameter portion of said first portion of
said bias voltage contact fits into said smaller diameter bore region for a better fit and better
electrical connection.

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41) An improved image forming apparatus as in claim 40 wherein said first portion of said
bias voltage contact press-fits into said developer roller.

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42) An improved image forming apparatus as in claim 40 wherein a spring makes electrical
contact between said second portion of said bias voltage contact and a power supply of said
improved image forming apparatus.

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43) An improved image forming apparatus as in claim 40 wherein a spring makes electrical
contact between said second portion of said bias voltage contact and a contact ring in said
endcap.

44) A method of making an improved image forming apparatus comprising of a dry toner style printer, copy machine or facsimile machine; and
whereby the improved image forming apparatus makes an image on media; and
whereby media may be paper, overhead slide media, microfilm, plastic, labels, cardboard, disk
5 labels, CDROM labels or any dry toner printable media used with a xerographic imaging device; and
whereby said method involves manufacturing an improved image forming apparatus which has a toner storage container, a waste toner hopper, a photoreceptor, a cleaning blade, a fuser section, a photoreceptor charging device and a transfer section;
10 whereby the toner storage container has a storage tank, an endcap and a developer roller; whereby the developer roller has a developer roller sleeve; and
whereby said method involves a step of placing a bias voltage contact in one end of the developer roller sleeve;
whereby the bias voltage contact has a first portion that fits inside the developer roller sleeve
15 and has electrical continuity with an inner wall of the developer roller sleeve;
whereby a second portion of the bias voltage contact has a portion that is cylindrical in shape and is of a smaller diameter than the first portion and ; and
whereby said method involves another step of making a counterbore in the developer roller sleeve whereby the developer roller sleeve has a larger diameter bore region and a
20 smaller diameter bore region; and
a first portion of the bias voltage contact has a larger diameter portion and a smaller diameter portion; and
the larger diameter portion of the first portion of the bias voltage contact fits into the larger diameter bore region while the smaller diameter portion of the first portion of the bias
25 voltage contact fits into the smaller diameter bore region for a better fit and better electrical connection.

45) A method as in claim 44 wherein said method involves a step wherein the first portion of the bias voltage contact press-fits into the developer roller.

45) A method as in claim 44 wherein said method involves a step wherein a spring electrically connects the second portion of a bias voltage contact to the power supply of the improved image forming apparatus.

46) A method as in claim 44 wherein said method involves a step wherein a spring electrically connects the second portion of the bias voltage contact to a contact ring in the endcap of a toner cartridge.